common turquoises, and not to those of the Orient, of which the color does not change.

Colorings for Jewelers' Work.—I.—Take 40 parts of saltpeter; 30 parts of alum; 30 parts of sea salt; or 100 grams of liquid ammonia; 3 parts sea salt; and 100 parts water. This is heated without bringing it to a boil, and the articles dipped into it for from 2 to 3 minutes, stirring the liquid constantly; after this bath they are dipped in alum water and then thoroughly rinsed in clean water.

II.—One hundred parts of calcium bromide and 2 parts of bromium. The objects are allowed to remain in this solution (which must be also constantly stirred) for from 2 to 3 minutes, then washed in a solution of sodium hyposulphite, after which they must be rinsed in clean water.

III.—Thirty parts of verdigris; 30 parts of sea salt; 30 parts of hematite; 30 parts of sal ammoniac, and 5 parts of alum. This must be all ground up together and mixed with strong vinegar; or we may also use 100 parts of verdigris; 100 parts of hydrochlorate of ammonia; 65 parts of saltpeter, and 40 parts of copper filings, all of which are to be well mixed with strong vinegar.

22-Carat Solder.—Soldering is a process which, by means of a more fusible compound, the connecting surfaces of metals are firmly secured to each other, but, for many practical purposes, it is advisable to have the fusing point of the metal and solder as near each other as possible, which, in the majority of cases, preserves a union more lasting, and the joint less distinguishable, in consequence of the similarity of the metal and solder in color, which age does not destroy, and this is not the case with solders the fusible points of which are very low. The metal to be soldered together must have an affinity for the solder, otherwise the union will be imperfect; and the solder should likewise act upon the metal, partly by this affinity or chemical attraction, and partly by cohesive force, to unite the connections soundly and firmly together. Solders should therefore be prepared suitable to the work in hand, if a good and lasting job is to be made. It should always be borne in mind that the higher the fusing point of the gold alloy —and this can be made to vary considerably, even with any specified quality— the harder solder must be used, for, in the case of a more fusible mixture of gold, the latter would melt before the solder and cause the work to be destroyed. A very good formula for the first, or ordinary, 22-carat alloy is this:

	dwts.	grs.
Fine gold	1	0
Fine silver	0	3
Fine copper	0	2
	1	5

This mixture will answer all the many purposes of the jobber; for soldering high quality gold wares that come for repairs, particularly wedding rings, it will be found admirably suited. If an easier solder is wanted, and such is very often the case with jobbing jewelers, especially where several solderings have to be accomplished, it is as well to have at hand a solder which will not disturb the previous soldering places, for if this is not prevented a very simple job is made very difficult, and a lot of time and patience wholly wasted. To guard against a thing of this kind the following solder may be employed on the top of the previous one:

	dwts.	grs.
Fine gold	1	0
Fine silver	0	3
Yellow brass	0	2
	1	5

This solder is of the same value as the previous one, but its melting point is lower, and it will be found useful for many purposes that can be turned to good account in a jobbing jeweler's business.

JEWELERS' ALLOYS:

See also Alloys and Solders.

18-Carat Gold for Rings.—Gold coin, 19½ grains; pure copper, 3 grains; pure silver, 1½ grains.

Cheap Gold, 12 Carat.—Gold coin, 25 grains; pure copper, 13⅓ grains; pure silver, 7⅓ grains.

Very Cheap 4-Carat Gold.—Copper, 18 parts; gold, 4 parts; silver, 2 parts.

Imitations of Gold.—I.—Platina, 4 pennyweights; pure copper, 2¼ pennyweights; sheet zinc, 1 pennyweight; block tin, 1¾ pennyweights; pure lead, 1½ pennyweight. If this should be found too hard or brittle for practical use, remelting the composition with a little sal ammoniac will generally render it malleable as desired.

II.—Platina, 2 parts; silver, 1 part; copper, 3 parts. These compositions, when properly prepared, so nearly resemble pure gold that it is very difficult to

distinguish them therefrom. A little powdered charcoal, mixed with metals while melting, will be found of service.

Best Oreide of Gold.—Pure copper, 4 ounces; sheet zinc, $1\frac{3}{4}$ ounces; magnesia, $\frac{5}{8}$ ounce; sal ammoniac, $\frac{11}{32}$ ounce; quicklime, $\frac{9}{32}$ ounce; cream tartar, $\frac{7}{8}$ ounce. First melt the copper at as low a temperature as it will melt; then add the zinc, and afterwards the other articles in powder, in the order named. Use a charcoal fire to melt these metals.

Bushing Alloy for Pivot Holes, etc.—Gold coin, 3 pennyweights; silver, 1 pennyweight, 20 grains; copper, 3 pennyweights, 20 grains; palladium, 1 pennyweight. The best composition known for the purpose named.

Gold Solder for 14- to 16-Carat Work.—Gold coin, 1 pennyweight; pure silver, 9 grains; pure copper, 6 grains; brass, 3 grains.

Darker Solder.—Gold coin, 1 pennyweight; pure copper, 8 grains; pure silver, 5 grains; brass, 2 grains. Melt together in charcoal fire.

Solder for Gold.—Gold, 6 pennyweights; silver, 1 pennyweight; copper, 2 pennyweights.

Soft Gold Solder.—Gold, 4 parts; silver, 1 part; copper, 1 part.

Solders for Silver (for the use of jewelers).—Fine silver, 19 pennyweights; copper, 1 pennyweight; sheet brass, 10 pennyweights.

White Solder for Silver.—Silver, 1 ounce; tin, 1 ounce.

Silver Solder for Plated Metal.—Fine silver, 1 ounce; brass, 10 pennyweights.

Solders for Gold.—I.—Silver, 7 parts; copper, 1 part; with borax.

II.—Gold, 2 parts; silver, 1 part; copper, 1 part.

III.—Gold, 3 parts; silver, 3 parts; copper, 1 part; zinc, $\frac{1}{2}$ part.

For Silver.—Silver, 2 parts; brass, 1 part; with borax; or, silver, 4 parts; brass, 3 parts; zinc, $\frac{1}{18}$ part; with borax.

Gold Solders (see also Solders).—I.—Copper, 24.24 parts; silver, 27.57 parts; gold, 48.19 parts.

II.—**Enamel Solder.**—Copper, 25 parts; silver, 7.07 parts; gold, 67.93 parts.

III.—Copper, 26.55 parts; zinc, 6.25 parts; silver, 31.25 parts; gold, 36 parts.

IV.—**Enamel Solder.**—Silver, 19.57 parts; gold, 80.43 parts.

Solder for 22-Carat Gold.—Gold of 22 carats, 1 pennyweight; silver, 2 grains; copper, 1 grain.

For 18-Carat Gold.—Gold of 18 carats, 1 pennyweight; silver, 2 grains; copper, 1 grain.

For Cheaper Gold.—I.—Gold, 1 pennyweight; silver, 10 grains; copper, 8 grains.

II.—Fine gold, 1 pennyweight; silver, 1 pennyweight; copper, 1 pennyweight.

Silver Solders (see also Solders).—I. (Hard.)—Copper, 30 parts; zinc, 12.85 parts; silver, 57.15 parts.

II.—Copper, 23.33 parts; zinc, 10 parts; silver, 66.67 parts.

III.—Copper, 26.66 parts; zinc, 10 parts; silver, 63.34 parts.

IV. (Soft.)—Copper, 14.75 parts; zinc, 8.50 parts; silver, 77.05 parts.

V.—Copper, 22.34 parts; zinc, 10.48 parts; silver, 67.18 parts.

VI.—Tin, 63 parts; lead, 37 parts.

FOR SILVERSMITHS:

I.—**Sterling Silver.**—Fine silver, 11 ounces, 2 pennyweights; fine copper, 18 pennyweights.

II.—**Equal to Sterling.**—Fine silver, 1 ounce; fine copper, 1 pennyweight, 12 grains.

III.—Fine silver, 1 ounce; fine copper, 5 pennyweights.

IV.—**Common Silver for Chains.**—Fine silver, 6 pennyweights; fine copper, 4 pennyweights.

V.—**Solder.**—Fine silver, 16 pennyweights; fine copper, 12 grains; pin brass, 3 pennyweights, 12 grains.

VI.—**Alloy for Plating.**—Fine silver, 1 ounce; fine copper, 10 pennyweights.

VII.—**Silver Solder.**—Fine silver, 1 ounce; pin brass, 10 pennyweights; pure spelter, 2 pennyweights.

VIII.—**Copper Solder for Plating.**—Fine silver, 10 pennyweights; fine copper, 10 pennyweights.

IX.—**Common Silver Solder.**—Fine silver, 10 ounces; pin brass, 6 ounces, 12 pennyweights; spelter, 12 pennyweights.

X.—**Silver Solder for Enameling.**—Fine silver, 14 pennyweights; fine copper, 8 pennyweights.

XI.—**For Filling Signet Rings.**—Fine silver, 10 ounces; fine copper, 1 ounce, 16 pennyweights; fine pin brass, 6 ounces, 12 pennyweights; spelter, 12 pennyweights.

XII.—Silver Solder for Gold Plating.—Fine silver, 1 ounce; fine copper, 5 pennyweights; pin brass, 5 pennyweights.

XIII.—Mercury Solder.—Fine silver, 1 ounce; pin brass, 10 pennyweights; bar tin, 2 pennyweights.

XIV.—Imitation Silver.—Fine silver, 1 ounce; nickel, 1 ounce, 11 grains; fine copper, 2 ounces, 9 grains.

XV.—Fine silver, 3 ounces; nickel, 1 ounce, 11 pennyweights; fine copper, 2 ounces, 9 grains; spelter, 10 pennyweights.

XVI.—Fine Silver Solder for Filigree Work.—Fine silver, 4 pennyweights, 6 grains; pin brass, 1 pennyweight.

Bismuth Solder.—Bismuth, 3 ounces; lead, 3 ounces, 18 pennyweights; tin, 5 ounces, 6 pennyweights.

BRASS:

I.—Yellow Brass for Turning.—(Common article.)—Copper, 20 pounds; zinc, 10 pounds; lead, 4 ounces.

II.—Copper, 32 pounds; zinc, 10 pounds; lead, 1 pound.

III.—Red Brass Free, for Turning.—Copper, 100 pounds; zinc, 50 pounds; lead, 10 pounds; antimony, 44 ounces.

IV.—Best Red Brass for Fine Castings.—Copper, 24 pounds; zinc, 5 pounds; bismuth, 1 ounce.

V.—Red Tombac.—Copper, 10 pounds; zinc, 1 pound.

VI.—Tombac.—Copper, 16 pounds; tin, 1 pound; zinc, 1 pound.

VII.—Brass for Heavy Castings.—Copper, 6 to 7 parts; tin, 1 part; zinc, 1 part.

VIII.—Malleable Brass.—Copper, 70.10 parts; zinc, 29.90 parts.

IX.—Superior Malleable Brass.—Copper, 60 parts; zinc, 40 parts.

X.—Brass.—Copper, 73 parts; zinc, 27 parts.

XI.—Copper, 65 parts; zinc, 35 parts.

XII.—Copper, 70 parts; zinc, 30 parts.

XIII.—German Brass.—Copper, 1 pound; zinc, 1 pound.

XIV.—Watchmakers' Brass.—Copper, 1 part; zinc, 2 parts.

XV.—Brass for Wire.—Copper, 34 parts; calamine, 56 parts.

XVI.—Brass for Tubes.—Copper, 2 parts; zinc, 1 part.

XVII.—Brass for Heavy Work.—Copper, 100 parts; tin, 15 parts; zinc, 15 parts.

XVIII.—Copper, 112 parts; tin, 13 parts; zinc, 1 part.

XIX.—Tombac or Red Brass.—Copper, 8 parts; zinc, 1 part.

XX.—Brass.—Copper, 3 parts; melt, then add zinc, 1 part.

XXI.—Buttonmakers' Fine Brass.—Brass, 8 parts; zinc, 5 parts.

XXII.—Buttonmakers' Common Brass.—Button brass, 6 parts; tin, 1 part; lead, 1 part. Mix.

XXIII.—Mallet's Brass.—Copper, 25.4 parts; zinc, 74.6 parts. Used to preserve iron from oxidizing.

XXIV.—Best Brass for Clocks.—Rose copper, 85 parts; zinc, 14 parts; lead, 1 part.

GOLD ALLOYS:

See also Gold Alloys, under Alloys.

Gold of 22 carats fine being so little used is intentionally omitted.

I.—Gold of 18 Carats, Yellow Tint.—Gold, 15 pennyweights; silver, 2 pennyweights, 18 grains; copper, 2 pennyweights, 6 grains.

II.—Gold of 18 Carats, Red Tint.—Gold, 15 pennyweights; silver, 1 pennyweight, 18 grains; copper, 3 pennyweights, 6 grains.

III.—Spring Gold of 16 Carats.—Gold, 1 ounce, 16 pennyweights; silver, 6 pennyweights; copper, 12 pennyweights. This when drawn or rolled very hard makes springs little inferior to steel.

IV.—Jewelers' Fine Gold, Yellow Tint, 16 Carats Nearly.—Gold, 1 ounce; silver, 7 pennyweights; copper, 5 pennyweights.

V.—Gold of Red Tint, 16 Carats.—Gold, 1 ounce; silver, 2 pennyweights; copper, 8 pennyweights.

Sterling Gold Alloys.—I.—Fine gold, 18 pennyweights, 12 grains; fine silver, 1 pennyweight; fine copper, 12 grains.

II.—Dry Colored Gold Alloys, 17 Carat.—Fine gold, 15 pennyweights; fine silver, 1 pennyweight, 10 grains; fine copper, 4 pennyweights, 17 grains.

III.—18 Carat.—Fine gold, 1 ounce; fine silver, 4 pennyweights, 10 grains; fine copper, 2 pennyweights, 5 grains.

IV.—18 Carat.—Fine gold, 15 pennyweights; fine silver, 2 pennyweights, 4 grains; fine copper, 2 pennyweights, 19 grains.

V.—18 Carat.—Fine gold, 18 pennyweights; fine silver, 2 pennyweights, 18

grains; fine copper, 3 pennyweights, 18 grains.

VI.—19 Carat.—Fine gold, 1 ounce; fine silver, 2 pennyweights, 6 grains; fine copper, 3 pennyweights, 12 grains.

VII.—20 Carat.—Fine gold, 1 ounce; fine silver, 2 pennyweights; fine copper, 2 pennyweights, 4 grains.

VIII.—22 Carat.—Fine gold, 18 pennyweights; fine silver, 12 grains; fine copper, 1 pennyweight, 3 grains.

IX.—Gold Solder for the Foregoing Alloys.—Take of the alloyed gold you are using, 1 pennyweight; fine silver, 6 grains.

X.—Alloy for Dry Colored Rings.—Fine gold, 1 ounce; fine silver, 4 pennyweights, 6 grains; fine copper, 4 pennyweights, 6 grains.

XI.—Solder.—Scrap gold, 2 ounces; fine silver, 3 pennyweights; fine copper, 3 pennyweights.

XII.—Dry Colored Scrap Reduced to 35s. Gold.—Colored scrap, 1 ounce, 9 pennyweights, 12 grains; fine silver, 2 pennyweights; fine copper, 17 pennyweights, 12 grains; spelter, 4 pennyweights.

To Quickly Remove a Ring from a Swollen Finger.—If the ring is of gold, pull the folds of the swollen muscles apart, so that it can be seen, then drop on it a little absolute alcohol and place the finger in a bowl of metallic mercury. In a very few minutes the ring will snap apart. If the ring is of brass, scrape the surface slightly, or put on a few drops of a solution of oxalic acid, or even strong vinegar, let remain in contact for a moment or two, then put into the mercury, and the result will be as before.

Soldering a Jeweled Ring.—In order to prevent the bursting of the jewels of a ring while the latter is being soldered, cut a juicy potato into halves and make a hollow in both portions in which the part of the ring having jewels may fit exactly. Wrap the jeweled portion in soft paper, place it in the hollow, and bind up the closed potato with binding wire. Now solder with easy-flowing gold solder, the potato being held in the hand. Another method is to fill a small crucible with wet sand, bury the jeweled portion in the sand, and solder in the usual way.

JEWELRY, TO CLEAN:
See Cleaning Preparations and Methods.

Kalsomine

Sodium carbonate...	8 parts
Linseed oil.....	32 parts
Hot water.....	8 parts
White glue.....	12 parts
Whiting.....	160 parts

Dissolve the sodium carbonate in the hot water, add the oil and saponify by heating and agitation. Cover the glue, broken into small pieces, with cold water and let soak overnight. In the morning pour the whole on a stout piece of stuff and let the residual water drain off, getting rid of as much as possible by slightly twisting the cloth. Throw the swelled glue into a capsule, put on the water bath, and heat gently until it is melted. Add the saponified oil and mix well; remove from the bath, and stir in the whiting, a little at a time, adding hot water as it becomes necessary. When the whiting is all stirred in, continue adding hot water, until a liquid is obtained that flows freely from the kalsomining brush.

The addition of a little soluble blue to the mixture increases the intensity of the white.

Sizing Walls for Kalsomine.—A size to coat over "hot walls" for the reception of the kalsomine is made by using shellac, 1 part; sal soda, ½ part. Put these ingredients in ½ gallon of water and dissolve by steady heat. Another size is made of glue size prepared in the usual way, and alum. To ½ pound of white glue add ¾ pound of alum, dissolving the alum in hot water before adding it to the glue size.

KARATS, TO FIND NUMBER OF:
See Jewelers' Formulas.

KERAMICS:
See Ceramics.

KERIT:
See Rubber.

KEROCLEAN:
See Cleaning Preparations and Methods.

KEROSENE DEODORIZER:
See also Benzine, Oils, and Petroleum.

Various processes have been recommended for masking the odor of kerosene such as the addition of various essential

oils, artificial oil of mirbane, etc., but none of them seems entirely satisfactory. The addition of amyl acetate in the proportion of 10 grams to the liter (1 per cent) has also been suggested, several experimenters reporting very successful results therefrom. Some years ago Beringer proposed a process for removing sulphur compounds from benzine, which would presumably be equally applicable to kerosene. This process is as follows:

Potassium permanganate	1 ounce
Sulphuric acid	½ pint
Water	3½ pints

Mix the acid and water, and when the mixture has become cold pour it into a 2-gallon bottle. Add the permanganate and agitate until it is dissolved. Then add benzine, 1 gallon, and thoroughly agitate. Allow the liquids to remain in contact for 24 hours, frequently agitating the mixture. Separate the benzine and wash in a similar bottle with a mixture of

Potassium permanganate	¼ ounce
Caustic soda	½ ounce
Water	2 pints

Agitate the mixture frequently during several hours; then separate the benzine and wash it thoroughly with water. On agitating the benzine with the acid permanganate solution an emulsion-like mixture is produced, which separates in a few seconds, the permanganate slowly subsiding and showing considerable reduction. In the above process it is quite probable that the time specified (24 hours) is greatly in excess of what is necessary, as the reduction takes place almost entirely in a very short time. It has also been suggested that if the process were adopted on a manufacturing scale, with mechanical agitation, the time could be reduced to an hour or two.

KEROSENE-CLEANING COMPOUNDS:
See Cleaning Preparations, under Miscellaneous Methods.

KEROSENE EMULSIONS:
See Petroleum.

KETCHUP (ADULTERATED), TESTS FOR:
See Foods.

KHAKI COLORS:
See Dyes.

KID:
See Leather.

KISSINGEN SALTS:
See Salts (Effervescent).

KISSINGEN WATER:
See Waters.

KNIFE-SHARPENING PASTES:
See Razor Pastes.

KNOCKENPLOMBE:
See Adhesives.

KNOTS:
See Paint.

KOLA CORDIAL:
See Wines and Liquors.

KOUMISS SUBSTITUTE:
See also Beverages.

To prepare a substitute for koumiss from cow's milk: Dissolve ½ ounce grape sugar in 3 fluid ounces water. Mix 18 grains well washed and pressed beer yeast with 2 fluid ounces of cow's milk. Mix the two liquids in a champagne bottle, fill with milk, stopper securely, and keep for 3 to 4 days at a temperature not exceeding 50° F., shaking frequently. The preparation does not keep longer than 4 to 5 days.

KÜMMEL:
See Wines and Liquors.

KWASS:
See Beverages.

LABEL PASTES, GLUES, AND MUCILAGES:
See Adhesives.

LABEL VARNISHES:
See Varnishes.

LACE LEATHER:
See Leather.

LACE, TO CLEAN GOLD AND SILVER:
See Cleaning Preparations and Methods.

LACES, WASHING AND COLORING OF:
See Laundry Preparations.

Lacquers

(See also Enamels, Glazes, Paints, Varnishes, and Waterproofing.)

INSTRUCTIONS FOR MAKING LACQUERS.

You will note that the formula for Clear Lacquer calls for 3 ounces of Di-Butyl Phthalate which we call the plasticiser. When making up a batch of

Clear Lacquer which you are going to put in cans and sell as Clear Lacquer you need to put in this Di-butyl Phthalate. But if you are going to mix the various colors with the clear lacquer to make the finished Brushing Lacquer Enamels, DO NOT put in the Di-Butyl Phthalate. The reason is this. The colors are ground in a mixture of gum solution and plastisciser, therefore already contain enough Di-Butyl Phthalate to give the film flexibility. It must GO IN when using the clear lacquer for Clear Lacquer but not when using the clear lacquer to mix with colors.

Practically any desirable shade can be obtained by mixing together in various proportions the colors. You can in this way make up certain shades of your own and get out a pretty color card showing your own shades.

When mixing the colors with the clear lacquer be sure to stir long and thoroughly until all mixed together. Also stir up the batch before you begin to fill the small cans.

The Brushing Lacquers can be sold to all of the dealers in your vicinity if you desire, or you can have agents out to sell them direct to the consumer.

The furniture Lacquer formulas can be sold for all purposes where a spraying lacquer is required. Furniture factories, or where woodwork is built and finished Lacquers are often used.

To make a colored spraying lacquer simply add the colors to the spraying lacquers instead of to the clear Brushing Lacquer. For spraying you will probably need to add about one ounce more black, 2 ounces more yellow, 2 ounces more red, 2 ounces green, 4 ounces more white and 2 ounces more blue to the gallon of clear than you would to a gallon of Brushing Clear Lacquer. In others increase the amount of each color as given above so that when adding Black Ground Color to the furniture Lacquer you will have three ounces instead of two ounces. Spraying Lacquers require a little more pigment to the gallon to get coverage.

In making up the clear lacquer you first dissolve the cottons in the Butyl and Ethyl Acetates. Then you add slowly to this the Damar and Ester Gum solutions which we tell you how to make in another instruction paper. Then you can slowly add the Alcohol, Butyl propionate and last of all the Petrol or L.D. Naptha. When adding each item do so very slowly and stir rapidly. This is IMPORTANT.

BRUSHING LACQUER FORMULAS:

Clear Lacquer No. 1.—

14 ounces ⅛ second cotton per gal. solvents
12 ounces Damar Gum per gal. solvents
6 ounces Ester Gum per gal. solvents
3 ounces Di-butyl Phthalate
40% Petrol or L.D. Naptha
20% Alcohol, denatured
15% Ethyl Acetate
20% Acetate-Butyl
5% Butyl propionate

Yellow Brushing Lacquer.—Add 12 ounces of Ground Yellow Pigment and 4 ounces of Ground White Pigment to get a good yellow lacquer, to each gallon clear lacquer.

White Lacquer Brushing.—Add 24 ounces of Ground White Pigment to a gallon of clear lacquer to make good White Brushing Lacquer.

Black Brushing Lacquer.—Add 2 ounces of Ground Black to each gallon of Clear Lacquer to make good Black Brushing Lacquer.

Red Brushing Lacquer.—Add 6 ounces of Red Ground Pigment and 4 ounces of Ground White Pigment to each gallon of clear lacquer to get good Red Brushing Lacquer.

Blue Brushing Lacquer.—Add 4 ounces Blue, 8 ounces White, ¼ ounce Black Ground Pigments to get good Blue Brushing Lacquer.

Brown Brushing Lacquer.—Add 6 ounces Red, 1 ounce Yellow, 4 ounces White and ½ ounce Black to make Brown Brushing Lacquer.

Green Brushing Lacquer.—Add 4 ounces Green, 2 ounces White to make good Green Brushing Lacquer. For additional density and deeper coverage add or increase amount of Green.

THINNER FORMULA FOR BRUSHING LACQUER.

50% Petrol or L.D. Naptha
15% Alcohol
15% Ethyl Acetate
20% Butyl Acetate

Add to a gallon of the above formula a pint of either Collosolve or Butyl Alcohol.

HOW TO DECORATE FURNITURE NOVELTIES.

In the past, home decorating has been considered a more or less exclusive art but it has now become almost, commonplace.

Women who never have indulged in this form of fascinating work have still to find out what pleasure it will bring to them.

Those who like to feel that they are actually creating something can do no better than to purchase the necessary items with which to accomplish this work and then get busy.

It is not only economical to purchase these pieces of undecorated furniture and then decorate them yourself but it is really a pleasure and will not seem at all like work to you. And I am sure that once you have finished a piece of furniture or a novelty and can look upon it and perhaps even scrutinize it for defective workmanship you will be surprised at its beauty. The desire to continue on will at once take place and you will then proceed to finish up odd pieces such as bookshelfs, magazine stands, etc.

You will find it not only a pleasure to do this work, if I may term it that, but you will also realize that it is highly educational. Who can doubt that when you mix your own shades in order to create the special color you desire but never could find, but that this is in itself educational. It will certainly be a pleasure to experiment and work out your own color schemes and obtain shades that you have long desired to have.

There are of course a few rules that can be followed in planning and doing this work.

In the first place you can get most of the items you wish to have in nearly all department stores and at present this line of endeavor has become so popular that gift shops, paint stores, etc., are also stocking up on the necessary materials.

There unpainted furniture is obtainable in the assembled form or it can be purchased in knock-down form. It is just as well to buy it knock-down as it is somewhat cheaper and so easy is it put together that a small child could do it.

The necessary finishing materials can usually be obtained in the same store where the furniture is purchased. You will probably wish to have your pieces finished in the well known lacquer finish. Therefore you will ask the clerk to show you the colors carried in stock, also the amount of lacquer required to finish up your pieces. Be sure to obtain a small can of Reducer with the Brushing Lacquer for when the lacquer gets thick and does not brush easily you will need to thin it out with this reducer.

In addition to the brushing lacquer you will require a very soft brush with which to appy the lacquer. No doubt the clerk will recommend a camel's hair brush or at least one that is very soft.

If you intend to stripe the furniture or the objcct that is to be finished it will also be necessary to obtain a tube or two of Japan or Oil colors together with a small striping brush. These striping brushes run in various sizes, depending upon the size of stripe you must have.

If you expect to put a design on the pieces such as a painted flower or so, you will do well to purchase a decalcomania transfer. These transfers come in a very large variety of patterns and sizes and range in prices of from five cents each up to a dollar. The clerk will probably give you instructions and material with which to put these on but in case you do not get the exact instructions and the material, purchase a very small bottle or can of white damar varnish and use this as the sticking medium with which to put on the decalcomania transfer.

You are now armed with the materials necessary to finish furniture novelties and can proceed to finish the furniture.

The first thing you do is to apply a coat of the brushing lacquer. When applying this always flow it on. That is; fill your brush full of material and spread it out but do not work back and forth as you do when using a house paint. This is important.

When applying lacquer it is imperative that you work fast as the lacquer dries very rapidly and if you do not brush on the material as fast as you can your work will be full of runs and streaked.

While applying the material it is a good idea to keep the surface on which you are working, with its flat side up so that the material cannot run up or down.

It is advantageous to apply three coats rather than two for on new furniture the first coat usually soaks in and acts as an undercoat on which the two succeeding coats are built up.

If you wish a very nice finished job you will do well in putting on four coats rather than three but it is not absolutely necessary. In any finishing work, it is always better to apply several light coats rather than a few heavy coats.

You should allow each coat about one hour to dry before applying the succeeding coat. Most brushing lacquers, especially those which are nationally advertised dry in about thirty minutes but as a general rule they are not dry enough in thirty minutes to warrant the application of another coat.

After you have applied the necessary coats and the final coat has become thoroughly dry you will be able to determine of your own accord if the work is satisfactory.

It is important to note that that one color will cover the surface much better than another. Light colors are usually not as opaque as darker colors and therefore when using an orange, yellow or a plain white lacquer enamel it is necessary to apply more coats to get the covering power.

Since the work has been lacquered it is now ready to be striped. Practice on some odd panels before you attempt to apply the stripe on the furniture you are finishing because it takes a little experience for one to draw a smooth, straight line. A good eye, a steady hand and continuous practice are the things that make one a good striper.

After you have striped the work you can put on one or more decalcomanias, depending upon the kind of furniture you are finishing. We advised above, how to apply these, with the use of white damar varnish. However in all probabilities you will be able to get good instructions for putting these on at the store where they are purchased.

Decalcomanias are very popular as they are much cheaper to apply than it would be to have the work painted by an artist. Furthermore it is now possible to obtain beautiful transfers, where flowers and other work done by nationally known artists have been reproduced.

FURNITURE LACQUER ENAMELS.

These lacquer enamels have been designed mostly for inside use on various objects made of wood and metal. Today, in this age of colors, the majority of wood and metal products are finished with a lacquer enamel. The wood and metal must first be filled and primed with undercoat products, formulas for these being given elsewhere, before the lacquer enamel can be applied successfully. Oil undercoats can be used underneath lacquer products but they are not to be highly recommended except for automobile finishing. In this case the surface is coated with an oxide primer made from an oil base but the surfacing material which is next applied is usually from a pyroxylin base. As a general rule these enamels are applied with a spray gun since they do not brush well owing to their high viscosity.

White Lacquer Enamel.—

Cotton nitro-cellulose ½ second viscosity	1¼ pounds
Damar Gum (solution formula)	½ pint
Ester Gum (see solution formula)	½ pint
Di-Butyl Phthalate (liquid ounces measure)	6 ounces
Titanox or Titanium Oxide (adv. weight)	27 ounces
Zinc Oxide	10 ounces
Butyl Acetate	2½ pints
Butyl Alcohol	1 pint
Ethyl Acetate	¾ pint
Ethyl Alcohol	¾ pint
Toluol	3 pints

Egg Shell White Enamel.—Use the same formula as for Black Auto Enamel except use 2½ pounds white pigment consisting of 75% Titanox and 25% Zinc Oxide. Also instead of 6 ounces of Di-Butyl Phthalate use 10 ounces.

High Gloss White Enamel.—Use same formulas as for Black Auto Lacquer Enamel except for gum content. Instead of 1 pint of Damar Gum solution use 2 pints and instead of 1½ pints Ester Gum solution use 2 pints. This gives a white enamel carrying good gloss.

Colors for Furniture Spraying.—Follow out color mixing suggestions given under heading of Brushing Lacquers.

FURNITURE LACQUER FORMULAS.

No. 1

½ second cotton	10 ounces
Ester Gum	8 ounces
Damar Gum	6 ounces
Di-butyl Phthalate	2½ ounces
Butyl Acetate	1 pound, 5 ounces
Butyl Alcohol	6 ounces
Ethyl Acetate	3 ounces
Ethyl Alcohol	1 pound
Toluol	2 pounds, 1 ounce

No. 2

½ second cotton	1 pound
Ester Gum	4 ounces
Damar Gum	4 ounces
Di-Butyl Phthalate	3 ounces
Butyl Acetate	1 pound, 9 ounces

Butanol	7 ounces
Ethyl Acetate	4 ounces
Toluol	1 pound, 8 ounces

The Furniture Lacquer No. 1 is the heavy bodied lacquer and this formula is for a lacquer ready to spread. No thinning is usually required for either No. 1 or No. 2. Both Lacquers are excellent for spray work on furniture, level out well, give good full body, spray nice and will rub good.

UNIVERSAL THINNERS.

As a general rule Lacquer Manufacturers supply lacquers to the factories and consumers in a consistency that makes them ready for brushing or spraying without reducing or thinning them. However sometimes enamels are supplied rather thick and before they can be brushed or sprayed or applied in any way they must be thinned down with a thinner. A thinner is a liquid consisting of about the same solvents that go into the making of the lacquer or lacquer enamel. This is especially true if the same manufacturer who supplies the lacquer supplies the thinner. However, there are many consumers who use a lacquer made by one company and a thinner by another and get good results even though the composition of both be somewhat different. Because of this we are listing a number of formulas for making thinners which can be called Universal Thinners in that most of them will work with any Lacquer Product on the market. Starting with No. 1 we list six formulas the first one being the lowest grade and No. 6 being the highest grade. No. 1 will answer purposes for most uses but in hot, sultry weather when there is a great amount of humidity in the air, the applied film may suck in some of this moisture and on such days we suggest the use of a higher grade thinner than No. 1. The higher the grade the less chance for a film brushing in humid weather. These thinners are not to be used for thinning Brushing Lacquers. Use the special Brushing Lacquer Thinner formulas. The formulas are written and must be formulated by the percentage method as for instance in No. 1. 14% Butyl Acetate, 5% Ethyl Alcohol, etc.

Nos.	*1*	*2*	*3*	*4*	*5*	*6*
Butyl Acetate	14	9	21	20	30	25
Butyl Alcohol	—	5	12	10	11	10
Ethyl Alcohol	5	8	—	5	—	10
Ethyl Acetate	15	11	—	—	—	—
Toluol	66	67	67	65	59	55

The use for a cleaning thinner is quite common in factories for washing lacquer and colors from the hands and for cleaning brushes and spray guns, etc. This must be a cheap product and still one which works well. The one we list herewith is very simple but it works very well.

Ethyl Acetate, 65%
V.M.P. Naptha, 35%

There are any number of Thinners used for Brushing Lacquers but we list herewith two prominent ones which will serve to reduce most any grade of Brushing Lacquer satisfactorily.

	No. 1	No. 2
Butyl Propionate	10%	
Butyl Acetate	5%	20%
Butanol	15%	5%
Diacetone Alcohol	5%	
Xylol	65%	
L.D. Naptha		50%
Ethyl Acetate		15%
Ethyl Alcohol, Denatured		10%

GOLD PAINTS, BRONZING LIQUIDS.

A Bronzing Liquid is a conveying solution which carries in it aluminum or copper powders which are used as coatings for chandeliers, novelties, picture frames, etc. These liquids must not contain free acid because the acid causes the bronze to turn green and the solution to gelatinize. Usually a very high viscosity cotton (commonly called nitro-cellulose) is used as the basic solid and sometimes additional gum or resin is incorporated into the solution. Special cotton for this purpose is manufactured and sold by the nitrators. Also a thick solution is considered most desirable for gilding or bronzing objects as it gives a good thick film, which, deposited over the powder acts as a permanent protective coating. In cases where the film is not thick enough an additional coat of the clear bronzing liquid can be applied to give further protection and perhaps additional gloss if the latter be desirable. It is customary to use a "Thinner" or "Reducer" along with the bronzing liquid for if the material be too heavy to brush or spray it can be thinned down with this material. The formula for the thinners is generally the same formula as the solvent part of the liquid formula. It is always good to use such a similar formula and never advisable to use a strange thinning formula with a liquid. It is not advisable to mix up a

batch of powder and liquid together and allow to stand for much time for a gelatinization takes place invariably. We give the formulas in their order of quality, No. 1 being the highest grade and No. 3 being the cheapest grade.

	No. 1	No. 2	No. 3
Cotton- 40 second B. liquid Viscosity	4 ozs.	4 ozs.	3 ozs.
Butyl Acetate (solvent for cotton)	1 pt.	½ pt.	½ pt.
Ethyl Acetate	¼ pt.	½ pt.	1 pt.
Amyl Acetate	¼ pt.		
Butyl Alcohol (known as Butanol)	½ pt.	¼ pt.	¼ pt.
Toluol	1½ pt.	1 pt.	½ pt.
Denatured Alcohol		1 pt.	½ pt.
Benzol			¼ pt.
Ester Gum (glycernized rosin)			1 oz.

In all formulas the Cotton is dissolved in the Butyl and Ethyl Acetates. Where the formula calls for a resin like in No. 3 the Resin is dissolved in the Toluol or Benzol. Then slowly add the gum solution after it is thoroughly dissolved into the cotton solution after that is all dissolved. Then add the denatured alcohol slowly. Last add the Butyl Alcohol. Where the formula calls for no gum or resin as in numbers One and Two the cotton is dissolved thoroughly in the Butyl, Ethyl and Amyl Acetates. Then the Butyl Alcohol added and last of all the Toluol is SLOWLY added always stirring fast to prevent a local precipitation.

AUTOMOBILE LACQUERS—BLACK AND COLORS.

It would be impossible to list a formula for every known color of automobile lacquer enamel because of lack of space. There are however a few rules that can be followed by the amateur lacquer maker so that he can obtain almost any shade he desires. First the clear lacquer is made and into this clear lacquer the Blacks, Whites and various colors are ground, usually the primary or basic colors. Then by inter-mixing these primary colors any shade can be arrived at. We therefore list only the primary colors or those which are most prominently used and required. It might also be stated that color mixing is an art, acquired only by careful practice and experience.

Black Auto Lacquer Enamel.—

Cotton (Nitro-Cellulose) ½ second	2 pounds
Ester Gum (see ins. making solution)	1 pint sol.
Damar Gum (see ins. making solution)	1½ pint sol.
Di-Butyl Phthalate	6 ounces
Chinese Blue Pigment	½ ounce
Super Spectra Carbon Black	2¾ ounces
Butyl Acetate	1⅓ pounds
Butyl Alcohol (Butanol)	½ pound
Ethyl Acetate	1⅓ pounds
Toluol	1⅓ pounds

By making up this above formula and leaving out the Black and Blue Pigment colors you will get a clear lacquer solution. Into this solution you can add ground colors or grind them in with the mill yourself, to obtain any shade desired. To know the approximate proportions of the colors needed to make various enamels, use the scale given under the headings "Brushing Lacquers." Since auto lacquers are to be sprayed on and not applied with a brush a slight increase in the amount of pigments can be made because a denser covering product is necessary. Also, because this formula given herewith contains much more solid matter than the clear brushing lacquer formulas, it will carry more pigment per gallon.

STOCK DAMAR GUM SOLUTION.

Dissolve 2½ lbs. of Damar Gum in the following mixture of solvents, 1½ pints Benzol, ¼ pint Ethyl Acetate, ¼ pint Acetone. After this has been stirred and allowed to dissolve completely 1½ pints of Denatured Alcohol are added. This gives a milky solution which must be allowed several days to completely settle. Then the milky part which in reality is the wax in the gum, settles to the bottom and forms a hard cake, the upper clear part is scooped or poured off. This last is the de-waxed Damar Solution and in a gallon of this solution there is 3 pounds of solid Damar. So if your formula calls for 1½ pounds of Damar Gum you would put in a ½ gallon of Damar Solution. Damar Gum cannot be used in a lacquer until it has been de-waxed.

ESTER GUM SOLUTION.

Dissolve 2 pounds of Ester Gum in 1½ pints Toluol and ½ pint Butyl or

Ethyl Acetate. This makes a solution containing 4 pounds of Ester Gum to a gallon of Ester Gum Solution. If your formula calls for 1 pound of Ester Gum put in a quart of Ester Gum Solution.

PYROXYLIN CEMENTS.

For mending leather belting and other such products the following Cement will serve very well. Usually the products consists of an 8 ounce cotton solution in various solvent mixtures.

High Viscosity Cotton	8	ounces
Ester Gum	2	ounces
Castor Oil	2	ounces
Ethyl Acetate	1	quart
Denatured Alcohol	1½	pints
Butyl Acetate	½	pint
Benzol	2	quarts

Pharmaceutical Collodion

High Viscosity Cotton	8	ounces
Ether	3	quarts
Alcohol	1	quart

Butyl Acetate solutions are also being used today and it is claimed that they give a better product than the one given above. Camphor can be used to make up a flexible Collodion product. Three ounces or less can be used to each gallon of finished product.

AIRPLANE DOPE AND FINISHES.

Various formulas are used by different manufacturers of airplane dopes and there is some difference of opinion as to which is the best formula. We will give herewith two accepted ones.

U. S. Patent No. 1, 320, 458 (this formula is patented).

Nitrated Cotton (high viscosity)	8 ounces
Ethyl Acetate	30%
Diacetone Alcohol	4%
Butanol	16%
Benzol	50%
Boiled Rapeseed Oil	16 ounces

The eight ounces of cotton are mixed with a gallon of the above solvents and rapeseed oil is then added.

Heavy Bodied Dope

High Viscosity Cotton	8 ounces
Low Viscosity Cotton (½ second)	26 ounces
Ethyl Acetate	25%
Denatured Alcohol	12½%
Butyl Acetate	12½%
Benzol	25%
Toluol	25%
Castor Oil	4 ounces

The cotton is dissolved into the Acetates and when thoroughly dissolved the alcohols are added slowly. Then the Benzol and Toluol are added very, very slowly, stirring rapidly to avoid a precipitation of the cotton and after it is all into solution Castor oil is added.

GOLD LACQUERS.

Liquid Bottle Lac.—Into a half-gallon bottle put 8 ounces of shellac, and pour over it 1½ pints of alcohol of 94 per cent, and 2½ ounces of sulphuric ether. Let stand, with occasional shaking, until the shellac is melted, and then add 4 ounces of thick turpentine and ½ ounce of boric acid. Shake until dissolved. To color, use the aniline colors soluble in alcohol—for red, eosine; blue, phenol blue; black, negrosin; green, aniline green; violet, methyl violet, etc. If it is desired to have the lac opaque, add 8 ounces of pulverized steatite, but remember to keep the lac constantly stirred while using, as otherwise the steatite falls to the bottom.

Lithographic Lacquer.—Dissolve 15 parts, by weight, of red lithol R or G in paste of 17 per cent, in 150 parts, by weight, of hot water. Boil for 2 minutes, shaking with 2.5 parts, by weight, of barium chloride. Dissolve in 25 parts, by weight, of water. Add to the mixture 100 parts, by weight, of aluminum hydrate of about 4 per cent. Cool, filter, and dry.

Lacquer for Microscopes, Mathematical Instruments, etc.—Pulverize 160 parts, by weight, turmeric root, cover it with 1,700 parts alcohol, digest in a warm place for 24 hours, and then filter. Dissolve 80 parts dragon's blood, 80 parts sandarac, 80 parts gum elemi, 50 parts gum gutta, and 70 parts seed lac, put in a retort with 250 parts powdered glass, pour over them the colored alcohol first made, and hasten solution by warming in the sand or water bath. When completely dissolved, filter.

To Fix Alcoholic Lacquers on Metallic Surfaces.—Dissolve 0.5 parts of crystallized boracic acid in 100 parts of the respective spirit varnish whereby the latter after being applied forms so hard a coating upon a smooth tin surface that it cannot be scratched off even with the finger-nails. The aforementioned percentage of boracic acid should not be exceeded in preparing the solution; otherwise the varnish will lose in intensity of color.

LAMPBLACK:

Production of Lampblack.—The last oil obtained in the distillation of coal tar, and freed from naphthalene as far as possible, viz., soot oil, is burned in a special furnace for the production of various grades of lampblack. In this furnace is an iron plate, which must always be kept glowing; upon this plate the soot oil trickles through a small tube fixed above it. It is decomposed and the smoke (soot) rises into four chambers through small apertures. When the quantity of oil destined for decomposition has been used up, the furnace is allowed to stand undisturbed for a few days, and only after this time has elapsed are the chambers opened by windows provided for that purpose. In the fourth chamber is the very finest lampblack, which the lithographers use, and in the third the fine grade employed by manufacturers of printers' ink, while the first and second contain the coarser soot, which, well sifted, is sold as flame lampblack.

From grade No. 1 the calcined lampblack for paper makers is also produced. For preparing this black capsules of iron plate with closing lid are filled, the stuff is stamped firmly into them and the cover smeared up with fine loam. The capsules are next placed in a well drawing stove and calcined, whereby the empyreumatic oils evaporate and the remaining lampblack becomes odorless. Allow the capsules to cool for a few days before opening them, as the soot dries very slowly, and easily ignites again as soon as air is admitted if the capsules are opened before. This is semi-calcined lampblack.

For the purpose of preparing completely calcined lampblack, the semi-calcined article is again jammed into fresh capsules. closing them up well and calcining thoroughly once more. After 2 days the capsules are opened containing the all-calcined lampblack in compact pieces.

For the manufacture of coal soot another furnace is employed. Asphalt or pitch is burned in it with exclusion of air as far as practicable. It is thrown in through the doors, and the smoke escapes through the chimney to the soot chambers, 1, 2, 3, 4, and 5, assorting itself there.

When the amount of asphalt pitch destined for combustion has burned up completely, the furnace is left alone for several days without opening it. After this time has elapsed the outside doors are slowly opened and some air is admitted. Later on they can be opened altogether after one is satisfied that the soot has cooled completely. Chamber 4 contains the finest soot black, destined for the manufacture of leather cloth and oil cloth. In the other chambers is fine and ordinary flame black, which is sifted and packed in suitable barrels. Calcined lampblack may also be produced from it, the operation being the same as for oil black.

LAMP BURNERS AND THEIR CARE:

See Household Formulas.

LAMPS:

Coloring Incandescent Lamps.—Incandescent light globes are colored by dipping the bulbs into a thin solution of collodion previously colored to suit with anilines soluble in collodion. Dip and rotate quickly, bulb down, till dry.

For office desks, room lights, and in churches, it appears often desirable to modify the glaring yellowish rays of the incandescent light. A slight collodion film of a delicate bluish, greenish, or pink shade will do that.

For advertising purposes the bulbs are often colored in two or more colors. It is also easy with a little practice to paint words or pictures, etc., on the bulbs with colored collodion with a brush.

Another use of colored collodion in pharmacy is to color the show globes on their inside, thus avoiding freezing and the additional weight of the now used colored liquids. Pour a quantity of colored collodion into the clean, dry globe, close the mouth and quickly let the collodion cover all parts of the inside. Remove the balance of the collodion at once, and keep it to color electric bulbs for your trade.

LARD:

Detection of Cottonseed Oil in Lard.—Make a 2 per cent solution of silver nitrate in distilled water, and acidify it by adding 1 per cent of nitrate acid, C. P. Into a test tube put a sample of the suspected lard and heat gently until it liquefies. Now add an equal quantity of the silver nitrate solution, agitate a little, and bring to a boil. Continue the boiling vigorously for about 8 minutes. If the lard remain clear and colorless, it may be accepted as pure. The presence of cottonseed oil or fat will make itself known by a coloration, varying from yellow, grayish green to brown, according to the amount present.

LATHE LUBRICANT:

See Lubricants.

LAUNDRY INKS:
See Household Formulas.

Laundry Preparations

BLUING COMPOUNDS:

Laundry Blue.—The soluble blue of commerce, when properly made, dissolves freely in water, and solutions so made are put up as liquid laundry blue. The water employed in making the solution should be free from mineral substances, especially lime, or precipitation may occur. If rain water or distilled water and a good article of blue be used, a staple preparation ought apparently to result; but whether time alone affects the matter of solubility it is impossible to state. As it is essential that the solution should be a perfect one, it is best to filter it through several thicknesses of fine cotton cloth before bottling; or if made in large quantities this method may be modified by allowing it to stand some days to settle, when the top portion can be siphoned off for use, the bottom only requiring filtration.

This soluble blue is said to be potassium ferri-ferrocyanide, and is prepared by gradually adding to a boiling solution of potassium ferricyanide (red prussiate of potash) an equivalent quantity of hot solution of ferrous sulphate, boiling for 2 hours and washing the precipitate on a filter until the washings assume a dark-blue color; the moist precipitate can then at once be dissolved by the further addition of a sufficient quantity of water. About 64 parts of the iron salt are necessary to convert 100 parts of the potassium salt into the blue compound.

Leaf bluing for laundry use may be prepared by coating thick sized paper with soluble blue formed into a paste with a mixture of dextrin mucilage and glycerine. Dissolve a given quantity of dextrine in water enough to make a solution about as dense as ordinary syrup, add about as much glycerine as there was dextrine, rub the blue smooth with a sufficient quantity of this vehicle and coat the sheets with the paint. The amount of blue to be used will depend of course on the intended cost of the product, and the amount of glycerine will require adjustment so as to give a mixture which will not "smear" after the water has dried out and yet remain readily soluble.

Ultramarine is now very generally used as a laundry blue where the insoluble or "bag blue" is desired. It is mixed with glucose, or glucose and dextrine, and pressed into balls or cakes. When glucose alone is used, the product has a tendency, it is said, to become soft on keeping, which tendency may be counteracted by a proper proportion of dextrin. Bicarbonate of sodium is added as a "filler" to cheapen the product, the quantity used and the quality of the ultramarine employed being both regulated by the price at which the product is to sell.

The coal-tar or aniline blues are not offered to the general public as laundry blues, but laundry proprietors have them frequently brought under their notice, chiefly in the form of solutions, usually 1 to 1½ per cent strong. These dyes are strong bluing materials, and, being in the form of solution, are not liable to speck the clothes. Naturally their properties depend upon the particular dye used; some are fast to acids and alkalies, others are fast to one but not to another; some will not stand ironing, while others again are not affected by the operation; generally they are not fast to light, but this is only of minor importance. The soluble, or cotton, blues are those most favored; these are made in a great variety of tints, varying from a reddish blue to a pure blue in hue, distinguished by such brands as 3R, 6B, etc. Occasionally the methyl violets are used, especially the blue tints. Blackley blue is very largely used for this purpose, being rather faster than the soluble blues. It may be mentioned that a 1 per cent solution of this dye is usually strong enough. Unless care is taken in dissolving these dyes they are apt to produce specks. The heat to which the pure blues are exposed in ironing the clothes causes some kinds to assume a purple tinge.

The cheapest aniline blue costs about three times as much as soluble blue, yet the tinctorial power of the aniline colors is so great that possibly they might be cheapened.

Soluble Blue.—I.—Dissolve 217 parts of prussiate of potash in 800 parts of hot water and bring the whole to 1,000 parts. Likewise dissolve 100 parts of ferric chloride in water and bring the solution also to 1,000 parts. To each of these solutions add 2,000 parts of cooking salt or Glauber's salt solution saturated in the cold and mix well. The solutions thus prepared of prussiate of potash and ferric chloride are now mixed together with stirring. Allow to settle and remove by suction the clear liquid containing undecomposed ferrocyanide of

potassium and Glauber's salt; this is kept and used for the next manufacture by boiling it down and allowing the salts to crystallize out. The percentage of ferrocyanide of potassium is estimated by analysis, and for the next production proportionally less is used, employing that obtained by concentration.

After siphoning off the solution the precipitate is washed with warm water, placed on a filter and washed out on the latter by pouring on cold water until the water running off commences to assume a strong blue color. The precipitate is then squeezed out and dried at a moderate heat (104° F.). The Paris blue thus obtained dissolves readily in water and can be extensively employed in a similar manner as indigo carmine.

II.—Make ordinary Prussian blue (that which has been purified by acids, chlorine, or the hypochlorites) into a thick paste with distilled or rain water, and add a saturated solution of oxalic acid sufficient to dissolve. If time be of no consequence, by leaving this solution exposed to the atmosphere, in the course of 60 days the blue will be entirely precipitated in soluble form. Wash with weak alcohol and dry at about 100° F. The resultant mass dissolves in pure water and remains in solution indefinitely. It gives a deep, brilliant blue, and is not injurious to the clothing or the hands of the washwoman.

The same result may be obtained by precipitating the soluble blue from its oxide solution by the addition of alcohol of 95 per cent, or with a concentrated solution of sodium sulphate. Pour off the mother liquid and wash with very dilute alcohol; or throw on a filter and wash with water until the latter begins to come off colored a deep blue.

Liquid Laundry Blue.—This may be prepared either with liquid Prussian blue or indigo carmine. Make a solution of gum dragon (gum tragacanth) by dissolving 1 to 2 ounces of the powdered gum in 1 gallon of cold water in which ½ ounce oxalic acid has been dissolved. The gum will take several days to dissolve, and will require frequent stirring and straining before use. To the strained portion add as much Prussian blue in fine powder as the liquid will dissolve without precipitating, and the compound is ready for use.

Instead of powdered Prussian blue, soluble Prussian blue may be used. This is made by dissolving solid Prussian blue in a solution of oxalic acid, but as the use of oxalic acid is to be deprecated for the use of laundresses, as it would set up blood poisoning should it get into any cuts in the flesh, it is best to prepare liquid blue by making a solution of yellow prussiate of potash (ferrocyanide of potassium) with water, and then by adding a sufficient quantity of chloride of iron to produce a blue, but not enough to be precipitated.

Ball Blue.—The ball sold for laundry use consists usually, if not always, of ultramarine. The balls are formed by compression, starch or some other excipient of like character being added to render the mass cohesive. Blocks of blue can, of course, be made by the same process. The manufacturers of ultramarine prepare balls and cubes of the pigment on a large scale, and it does not seem likely that there would be a sufficient margin of profit to justify the making of them in a small way from the powdered pigment. Careful experiments, however, would be necessary to determine this positively. Ultramarine is of many qualities, and it may be expected that the balls will vary also in the amount of "filling" according to the price at which they are to be sold.

Below is a "filled" formula:

Ultramarine.....	6 ounces
Sodium carbonate....	4 ounces
Glucose.....	1 ounce
Water, a sufficient quantity.	

Make a thick paste, roll into sheets, and cut into tablets. The balls in bulk can be obtained only in large packages of the manufacturers, say barrels of 200 pounds; but put up in 1-pound boxes they can be bought in cases as small as 28 pounds.

Laundry Blue Tablets.—

Ultramarine.....	6 ounces
Sodium carbonate....	4 ounces
Glucose.....	1 ounce
Water, a sufficient quantity.	

Make a thick paste, roll into sheets, and cut into tablets.

Polishes or Glaze for Laundry Work.—I.—To a mixture of 200 parts each of Japan wax and paraffine, add 100 parts of stearic acid, melt together, and cast in molds. If the heated smoothing iron be rubbed with this wax the iron will not merely get over the surface much more rapidly, but will leave a handsome polish.

Laundry Gloss Dressing.—

II.—Dissolve white wax, 5.0 parts, in ether, 20.5 parts, and add spirit, 75.0 parts. Shake before use.

Heat until melted, in a pot, 1,000 parts

of wax and 1,000 parts of stearine, as well as a few drops of an essential oil. To the hot liquid add with careful stirring 250 parts of ammonia lye of 10 per cent, whereby a thick, soft mass results immediately. Upon further heating same turns thin again, whereupon it is diluted with 20,000 parts of boiling water, mixed with 100 parts of starch and poured into molds.

STARCHES.

Most laundry starches now contain some polishing mixture for giving a high luster.

I.—Dissolve in a vessel of sufficient capacity, 42 parts of crystallized magnesium chloride in 30 parts of water. In another vessel stir 12 parts of starch in 20 parts of water to a smooth paste. Mix the two and heat under pressure until the starch is fluidified.

II.—Pour 250 parts, by weight, of water, over 5 parts, by weight, of powdered gum tragacanth until the powder swells uniformly; then add 750 parts, by weight, of boiling water, dissolve 50 parts, by weight, of borax in it, and stir 50 parts, by weight, of stearine and 50 parts, by weight, of talcum into the whole. Of this fluid add 250 parts to 1,000 parts of boiled starch, or else the ironing oil is applied by means of a sponge on the starched wash, which is then ironed.

	By weight
III.—Starch	1,044 parts
Borax	9 parts
Common salt	1 part
Gum arabic	8 parts
Stearine	20 parts

WASHING FLUIDS, BRICKS AND POWDERS:

Washing Fluids.—Rub up 75 parts of milk of sulphur with 125 parts of glycerine in a mortar, next add 50 parts of camphorated spirit and 1 part of lavender oil, and finally stir in 250 parts of rose water and 1,000 parts of distilled water. The liquid must be stirred constantly when filling it into bottles, since the sulphur settles rapidly and would thus be unevenly distributed.

Grosser's Washing Brick.—

Water	54 parts
Sodium hydrate	38.21 parts
Sodium biborate	6.61 parts
Sodium silicate	1.70 parts

Haenkel's Bleaching Solution.—

Water	36.15 parts
Sodium hydrate	40.22 parts
Sodium silicate	23.14 parts

Luhn's Washing Extract.—

Water	34.50 parts
Sodium hydrate	25.33 parts
Soap	39.40 parts

Washing Powders.—

I.—Sodium carbonate, partly effloresced.	2 parts
Soda ash	1 part
II.—Sodium carbonate, partly effloresced.	6 parts
Soda ash	3 parts
Yellow soap	1 part
III.—Sodium carbonate, partly effloresced	3 parts
Soap bark	1 part
IV.—Sodium carbonate, partly effloresced Borax Yellow soap	Equal parts.

V.—A good powder can be made from 100 parts of crystal soda, 25 parts of dark-yellow rosin-cured soap, and 5 parts of soft soap. The two latter are placed in a pan, along with one-half the soda (the curd soap being cut into small lumps), and slowly heated, with continual crutching, until they are thoroughly melted—without, however, beginning to boil. The fire is then drawn and the remaining soda crutched in until it, too, is melted, this being effected by the residual heat of the mass and the pan. The mass will be fairly thick by the time the soda is all absorbed. After leaving a little longer, with occasional stirring, the contents are spread out on several thin sheets of iron in a cool room, to be then turned over by the shovel at short intervals, in order to further cool and break down the mixture. The soap will then be in a friable condition, and can be rubbed through the sieve, the best results being obtained by passing through a coarse sieve first, and one of finer mesh afterwards. With these ingredients a fine yellow-colored powder will be obtained. White stock soap may also be used, and, if desired, colored with palm oil and the same colorings as are used for toilet soaps. The object of adding soft soap is to increase the solubility and softness of the powder, but the proportion used should not exceed one-third of the hard soap, or the powder will be smeary and handle moist. The quality of the foregoing product is good, the powder being stable and not liable to ball, even after prolonged storage; neither does it wet the paper in which it is packed, nor swell up, and therefore the packets retain their appearance.

In making ammonia-turpentine soap powder the ammonia and oil of turpentine are crutched into the mass shortly before removing it from the pan, and if the powder is scented—for which purpose oil of mirbane is mostly used—the perfume is added at the same stage.

To Whiten Flannels.—Dissolve, by the aid of heat, 40 parts of white castile soap, shaved fine, in 1,200 parts of soft water, and to the solution, when cold, gradually add, under constant stirring, 1 part of the strongest water of ammonia. Soak the goods in this solution for 2 hours, then let them be washed as usual for fine flannels. A better process, in the hands of experts, is to soak the goods for an hour or so in a dilute solution of sodium hyposulphite, remove, add to the solution sufficient dilute hydrochloric acid to decompose the hyposulphite. Replace the goods, cover the tub closely, and let remain for 15 minutes longer. Then remove the running water, if convenient, and if not, wring out quickly, and rinse in clear water. One not an expert at such work must be very careful in the rinsing, as care must be taken to get out every trace of chemical. This is best done by a second rinsing.

Ink for the Laundry.—The following is said to make a fine, jet-black laundry ink:

a.	Copper chloride, crystals	85 parts
	Sodium chlorate	106 parts
	Ammonium chloride	53 parts
	Water, distilled	600 parts
b.	Glycerine	100 parts
	Mucilage gum arabic (gum, 1 part; water, 2 parts)	200 parts
	Aniline hydrochlorate	200 parts
	Distilled water	300 parts

Make solutions *a* and *b* and preserve in separate bottles. When wanted for use, mix 1 part of solution *a* with 4 parts of solution *b*.

Laces, Curtains, etc.—I.—To give lace curtains, etc., a cream color, take 1 part of chrysoidin and mix with 2 parts of dextrin and dissolve in 250 parts of water. The articles to be washed clean are plunged in this solution. About an ounce of chrysoidin is sufficient for 5 curtains.

II.—Washing curtains in coffee will give them an ecru color, but the simplest way to color curtains is with "Philadelphia yellow" (G. or R. of the Berlin *Aktiengesellschaft's* scale).

LAUNDRY SOAP:
See Soap.

LAVATORY DEODORANT:
See Household Formulas.

LAXATIVES FOR CATTLE AND HORSES:
See Veterinary Formulas.

LEAD:
See also Metals.

Simple Test for Red Lead and Orange Lead.—Take a little of the sample in a test tube, add pure, strong nitric acid and heat by a Bunsen burner until a white, solid residue is obtained. Then add water, when a clear, colorless solution will be obtained. A white residue would indicate adulteration with barytes, a red residue or a yellow solution with oxide of iron. The presence of iron may be ascertained by adding a few drops of a solution of potassium ferrocyanide (yellow prussiate of potash) to the solution, when a blue precipitate will be obtained if there be the least trace of iron present.

LEAD, TO TAKE BOILING, IN THE MOUTH:
See Pyrotechnics.

LEAD ALLOYS:
See Alloys.

LEAD PAPER:
See Paper.

LEAD PLATE, TINNED:
See Plating.

LEAKS, IN BOILERS, STOPPING:
See Putties.

LEAKS:

To Stop Leakage in Iron Hot-Water Pipes.—Take some fine iron borings or filings and mix with them sufficient vinegar to form a sort of paste, though the mixture is not adhesive. With this mixture fill up the cracks where the leakage is found, having previously dried the pipe. It must be kept dry until the paste has become quite hard. If an iron pipe should burst, or there should be a hole broken into it by accident, a piece of iron may be securely fastened over it, by bedding it on in paste made of the borings and vinegar as above, but the pipe should not be disturbed until it has become perfectly dry.

To Prevent Wooden Vessels from Leaking. (See also Casks.)—Wooden

vessels, such as pails, barrels, etc., often become so dry that the joints do not meet, thus causing leakage. In order to obviate this evil stir together 60 parts hog's lard, 40 parts salt, and 33 parts wax, and allow the mixture to dissolve slowly over a fire. Then add 40 parts charcoal to the liquid mass. The leaks in the vessels are dried off well and filled up with putty while still warm. When the latter has become dry, the barrels, etc., will be perfectly tight. If any putty is left, keep in a dry place and heat it to be used again.

Leather

(See also Shoes.)

Artificial Leather.—Pure Italian hemp is cut up fine; 1 part of this and ½ part of coarse, cleaned wool are carded together and formed into wadding. This wadding is packed in linen and felted by treatment with hot acid vapors. The resulting felt is washed out, dried, and impregnated with a substance whose composition varies according to the leather to be produced. Thus, good sole leather, for instance, is produced according to a Danish patent, in the following manner: Mix together 50 parts of boiled linseed oil; 20 parts of colophony; 25 parts of French turpentine; 10 parts of glycerine, and 10 parts of vegetable wax, and heat over a water bath with some ammonia water. When the mass has become homogeneous, add 25 parts of glue, soaked in water, as well as a casein solution, which latter is produced by dissolving 50 parts, by weight, of moist, freshly precipitated casein in a saturated solution of 16 parts of borax and adding 10 parts of potassium bichromate, the last two also by weight. Finally, mineral dyestuffs as well as antiseptic substances may be added to the mass. The whole mixture is now boiled until it becomes sticky and the felt is impregnated with it by immersion. The impregnated felt is dried for 24 hours at an ordinary temperature; next laid into a solution of aluminum acetate and finally dried completely, dyed, and pressed between hot rollers.

Black Dye for Tanned Leather.—This recipe takes the place of the ill-smelling iron blacking, and is not injurious to the leather. Gallnuts, pulverized, 150 parts; vitriol, green or black, 10 parts; rock candy, 60 parts; alum, 15 parts; vinegar, 250 parts; cooking salt, 20 parts. Dissolve with 4,000 parts of distilled water.

Boil this solution slowly and the blacking is done. When it has cooled and settled, pour through linen, thus obtaining a pure, good leather blacking.

Bronze Leather.—All sorts of skins—sheepskins, goatskins, coltskins, and light calfskins—are adapted for the preparation of bronze leather. In this preparation the advantage lies not only in the use of the faultless skins, but scarified skins and those of inferior quality may also be employed. The dressing of the previously tanned skin must be carried out with the greatest care, to prevent the appearance of spots and other faults. After tanning, the pelts are well washed, scraped, and dried. Then they are bleached. For coloring, it is customary to employ methyl violet which has previously been dissolved in hot water, taking 100 parts, by weight, of the aniline color to 8,000 parts, by weight, of water. If in the leather-dressing establishment a line of steam piping be convenient, it is advisable to boil up all the coloring dyes, rather than simply to dissolve them; for in this way complete solution is effected. Where steam is used no special appliance is required for boiling up the dyes, for this may take place without inconvenience in the separate dye vats. A length of steam hose and a brass nozzle with a valve is all that is needed. It may be as well to add here that the violet color for dyeing may be made cheaper than as above described. To 3,000 parts, by weight, of pretty strong logwood decoction add 50 parts, by weight, of alum and 100 parts, by weight, of methyl violet. This compound is almost as strong as the pure violet solution, and instead of 8,000 parts, by weight, we now have 30,000 parts, by weight, of color.

The color is applied and well worked in with a stiff brush, and the skins allowed to stand for a short time, sufficient to allow the dye to penetrate the pores, when it is fulled. As for the shade of the bronze, it may be made reddish, bluish, or brownish, according to taste.

For a reddish or brownish ground the skins are simply fulled in warm water, planished, fulled again, and then dyed. According to the color desired, the skins are treated with cotton blue and methyl violet R, whereupon the application of the bronze follows.

The bronze is dissolved in alcohol, and it is usual to take 200 parts, by weight, of bronze to 1,000 of alcohol. By means of this mixture the peculiar component parts of the bronze are dissolved. For a fundamental or thorough

solution a fortnight is required. All bronze mixtures are to be well shaken or agitated before using. Skins may be bronzed, however, without the use of the bronze colors, for it is well known that all the aniline dyes present a bronze appearance when highly concentrated, and this is particularly the case with the violet and red dyes. If, therefore, the violet be applied in very strong solutions, the effect will be much the same as when the regular bronze color is employed.

Bronze color on a brown ground is the most beautiful of all, and is used to the greatest advantage when it is desirable to cover up defects. Instead of warm clear water in such a case, use a decoction of logwood to which a small quantity of alum has been added, and thus, during the fulling, impart to the skins a proper basic tint, which may, by the application of a little violet or bronze color, be converted into a most brilliant bronze. By no means is it to be forgotten that too much coloring matter will never produce the desired results, for here, as with the other colors, too much will bring out a greenish tint, nor will the gloss turn out so beautiful and clear. Next rinse the skins well in clean water, and air them, after which they may be dried with artificial heat. Ordinary as well as damaged skins which are not suitable for chevreaux (kid) and which it is desirable to provide with a very high polish, in order the more readily to conceal the defects in the grain, and other imperfections, are, after the drying, coated with a mixture, compounded according to the following simple formula: Stir well 1 pint of ox blood and 1 pint of unboiled milk in 10 quarts of water, and with a soft sponge apply this to the surface of the skin. The blood has no damaging effect upon the color. Skins thus moistened must not be laid one upon another, but must be placed separately in a thoroughly well-warmed chamber to dry. When dry they are glossed, and may then be pressed into shagreen or pebbled. The thin light goatskins are worked into kid or chevreaux. Properly speaking, they are only imitation chevreaux (kid), for although they are truly goatskins, under the term chevreaux one understands only such skins as have been cured in alum and treated with albumen and flour.

After drying, these skins are drawn over the perching stick with the round knife, then glossed, stretched, glossed again, and finally vigorously brushed upon the flesh side with a stiff brush. The brushing should be done preferably by hand, for the brushing machines commonly pull the skins out of all shape. Brushing is intended only to give the flesh side more of a flaky appearance.

During the second glossing care must be taken that the pressure is light, for the object is merely to bring the skin back into its proper shape, lost in the stretching; the glossing proper should have been accomplished during the first operation.

Cracked Leather.—The badly cracked and fissured carriage surface greets the painter on every hand. The following is the recipe for filling up and facing over such a surface: Finest pumice stone, 6 parts; lampblack (in bulk), 1 part; common roughstuff filler, 3 parts. Mix to stiff paste in good coach japan, 5 parts; hard drying rubbing varnish, 1 part. Thin to a brushing consistency with turpentine, and apply 1 coat per day. Put on 2 coats of this filler and then 2 coats of ordinary roughstuff. Rub with lump pumice stone and water. This process does not equal burning off in getting permanently rid of the cracks, but when the price of painting forbids burning off, it serves as an effective substitute. Upon a job that is well cared for, and not subjected to too exacting service, this filler will secrete the cracks and fissures for from 3 to 5 months.

DRESSINGS FOR LEATHER:

For Carriage Tops.—I.—Here is an inexpensive and quickly prepared dressing for carriage tops or the like: Take 2 parts of common glue; soak and liquefy it over a fire. Three parts of castile soap are then dissolved over a moderate heat. Of water, 120 parts are added to dissolve the soap and glue, after which an intimate mixture of the ingredients is effected. Then 4 parts of spirit varnish are added; next, 2 parts of wheat starch, previously mixed in water, are thrown in. Lampblack in a sufficient quantity to give the mixture a good coloring power, without killing the gloss, is now added. This preparation may be used as above prepared, or it may be placed over a gentle fire and the liquid ingredients slowly evaporated. The evaporated mass is then liquefied with beer as shop needs demand.

II.—Shabby dark leather will look like new if rubbed over with either linseed oil or the well-beaten white of an egg mixed with a little black ink. Polish with soft dusters until quite dry and glossy.

Polishes.—I.— Dissolve sticklac, 25

parts; shellac, 20 parts; and gum benzoin, 4 parts, all finely powdered, in a rolling cask containing 100 parts of 96 per cent alcohol; perfume with 1 part of oil of rosemary. Upon letting stand for several days, filter the solution, whereupon a good glossy polish for leather, etc., will be obtained.

II.—Dissolve 2 pounds of borax in 4 gallons of water and add 5 pounds of shellac to the boiling liquid in portions, till all is dissolved. Then boil half an hour, and finally stir in 5 pounds of sugar, 2½ pounds of glycerine, and 1½ pounds of soluble nigrosin. When cold add 4 pounds of 95 per cent methylated spirit.

III.—

Ox blood, fresh, clean	1,000 parts
Commercial glycerine	200 parts
Oil of turpentine	300 parts
Pine oil (rosin oil)	5,000 parts
Ox gall	200 parts
Formalin	15 parts

Mix in the order named, stirring in each ingredient. When mixed strain through linen.

Kid Leather Dressings.—Creams for greasing fine varieties of leather, such as kid, patent leather, etc., are produced as follows, according to tried recipes:

White Cream.—

Lard	75 parts
Glycerine, technical	25 parts
Mirbane oil, ad libitum.	

Black Cream.—

Lard	100 parts
Yellow vaseline	20 parts
Glycerine, technical	10 parts
Castor oil, technical	10 parts

Dye black with lampblack and perfume with oil of mirbane.

Colored Cream.—

Lard	100 parts
Castor oil	20 parts
Yellow wax	25 parts
White vaseline	30 parts

Dye with any desired dyestuff, e. g., red with anchusine, green with chlorophyl. In summer it is well to add some wax to the first and second prescriptions. These are for either Morocco or kid:

I.—Shellac	2 parts
Benzoin	2 parts
Yellow wax	5 parts
Soap liniment	7 parts
Alcohol	600 parts

Digest until solution is effected, then allow the liquid to stand in a cool place for 12 hours and strain. Apply with a bit of sponge or soft rag; spread thinly and evenly over the surface, without rubbing much. If dirty, the leather should first be washed with a little soft soap and warm water, wiped well, and allowed to dry thoroughly before the dressing is put on.

II.—Oil of turpentine	8 ounces
Suet	2 pounds
Soft soap	8 ounces
Water	16 ounces
Lampblack	4 ounces

Patent Leather Dressings.—

I.—Wax	22 parts
Olive oil	60 parts
Oil turpentine, best	20 parts
Lavender oil	10 parts

With gentle heat, melt the wax in the oil, and as soon as melted remove from the fire. Add the turpentine oil, incorporate, and when nearly cold, add and incorporate the lavender oil.

II.—Wax	22 parts
Olive oil	60 parts
Oil of turpentine	30 parts

With gentle heat, melt the wax in the olive oil, and as soon as melted remove from the fire. When nearly cold stir in the turpentine.

Red Russia Leather Varnish.—

Shellac	1.20 parts
Dammar rosin, powdered	0.15 parts
Turpentine, Venice	0.60 parts

Dissolve with frequent shaking in 12 parts of alcohol (95 per cent), add 1.8 parts of powdered red sanders wood, let stand for 3 days and filter. The object of this varnish is to restore the original color to worn Russia leather boots, previously cleaned with benzine.

Russet Leather Dressing.—The following formulas are said to yield efficient preparations that are at once detersive and polishing, thus rendering the use of an extra cleaning liquid unnecessary.

I.—Soft soap	2 parts
Linseed oil	3 parts
Annatto solution (in oil)	8 parts
Beeswax	3 parts
Turpentine	8 parts
Water	8 parts

Dissolve the soap in the water, and add the annatto; melt the wax in the oil and turpentine, and gradually stir in the soap solution, stirring until cold.

II.—Palm oil	16	parts
Common soap	48	parts
Oleic acid	32	parts
Glycerine	10	parts
Tannic acid	1	part

Melt the soap and palm oil together at a gentle heat, and add the oleic acid; dissolve the tannic acid in the glycerine, add to the hot soap and oil mixture, and stir until perfectly cold.

Shoe Leather Dressing.—Over a water bath melt 50 parts, by weight, of oil of turpentine; 100 parts, by weight, of olive oil; 100 parts, by weight, of train oil; 40 parts, by weight, of carnauba wax; 15 parts, by weight, of asphaltum; and 2 parts, by weight, of oil of bitter almonds.

DYEING LEATHER.

In dyeing leather, aniline or coal-tar colors are generally used. These dyes, owing to their extremely rapid action on organic substances, such as leather, do not readily adapt themselves to the staining process, because a full brushful of dye liquor would give a much deeper coloration than a half-exhausted brush would give. Consequently, to alter and to color leather by the staining process results in a patchy coloration of the skin. In the dyeing operation a zinc shallow trough, 4 to 6 inches deep, is used, into which the dye liquor is put, and to produce the best results the contents of the trough are kept at a uniform temperature by means of a heating apparatus beneath the trough, such as a gas jet or two, which readily allows of a heat being regulated. The skins to be dyed are spread out flat in the dye trough, one at a time, each skin remaining in the dye liquor the time prescribed by the recipe. The best coloration of the skin is produced by using 3 dye troughs of the same dye liquor, each of different strength, the skin being put in the weakest liquor first, then passed into the second, and from there into the third dye liquor, where it is allowed to remain until its full depth of color is obtained. Very great skill is required in the employment of aniline dyes, as if the heat be too great, or the skins remain too long in the final bath, "bronzing" of the color occurs. The only remedy for this (and that not always effectual) is to sponge the skin with plenty of cold, clean water, directly it is taken out of the final dye bath. The dyed skins are dried and finished as before.

Leather Brown.—

Extract of fustic	5	ounces
Extract of hypernic	1	ounce
Extract of logwood	½	ounce
Water	2	gallons

Boil all these ingredients for 15 minutes, and then dilute with water to make 10 gallons of dye liquor. Use the dye liquor at a temperature of 110° F.

Mordant.—Dissolve 3 ounces of white tartar and 4 ounces of alum in 10 gallons of water.

Fast Brown.—Prepare a dye liquor by dissolving 1½ ounces fast brown in 1 gallon of water, and make a 10-gallon bulk of this. Use at a temperature of 110° F., and employ the same mordanting liquor as in last recipe.

Bismarck Brown.—

Extract of fustic	4	ounces
Extract of hypernic	1	ounce
Extract of logwood	½	ounce
Water	2	gallons

Preparation.—Boil all together for 15 minutes.

Method of Dyeing.—First mordant the skins with a mordanting fluid made by dissolving 3 ounces tartar and ½ ounce borax in 10 gallons of water. Then put the skins into the above foundation bath at a temperature of 100° F. Take them out, and then put in 1 ounce of Bismarck brown, dissolved in boiling water. Put the skins in again until colored deep enough, then lift out, drip and dry.

HARNESS PREPARATIONS:

Blacking for Harness.—I.—In a water bath dissolve 90 parts of yellow wax in 900 parts of oil of turpentine; aside from this mix well together, all the ingredients being finely powdered, 10 parts of Prussian blue, 5 parts of indigo, 50 parts of bone black, and work this into a portion of the above-mentioned waxy solution. Now throw this into the original solution, which still remains in the water bath, and stir it vigorously until the mass becomes homogeneous, after which pour it into any convenient earthenware receptacle.

II.—Best glue, 4 ounces; good vinegar, 1½ pints; best gum arabic, 2 ounces; good black ink, ½ pint; best isinglass, 2 drachms. Dissolve the gum in the ink, and melt the isinglass in another vessel in as much hot water as will cover it. Having first steeped the glue in the vinegar until soft, dissolve it completely by the aid of heat, stirring to prevent burning. The heat should not exceed 180° F. Add the gum and ink, and allow the mixture to rise again to the same temperature. Lastly mix the solution in isinglass, and remove from fire. When

used, a small portion must be heated until fluid, and then applied with a sponge and allowed to dry on.

Dressings for Harness.—

I.—Ox blood, fresh and well purified	100	parts
Glycerine, technical	20	parts
Turpentine oil	30	parts
Pine oil	50	parts
Ox gall	20	parts
Formalin	1½	parts

The raw materials are stirred together cold in the order named. Pour the mixture through thin linen. It imparts a wonderful mild, permanent gloss.

II.—A French harness dressing of good quality consists of oil of turpentine, 900 parts; yellow wax, 90 parts; Berlin blue, 10 parts; indigo, 5 parts; and bone black, 50 parts. Dissolve the yellow wax in the oil of turpentine with the aid of moderate heat in a water bath, mix the remaining substances, which should previously be well pulverized, and work them with a small portion of the wax solution. Finally, add the rest of the wax solution, and mix the whole well in the water bath. When a homogeneous liquid has resulted, pour it into earthen receptacles.

Harness Oils.—

I.—Neatsfoot oil	10	ounces
Oil of turpentine	2	ounces
Petrolatum	4	ounces
Lampblack	½	ounce

Mix the lampblack with the turpentine and the neatsfoot oil, melt the petrolatum and mix by shaking together.

II.—Black aniline	35	grains
Muriatic acid	50	minims
Bone black	175	grains
Lampblack	18	grains
Yellow wax	2½	av. ounces
Oil of turpentine	22	fluidounces

III.—Oil of turpentine	8	fluidounces
Yellow wax	2	av. ounces
Prussian blue	½	av. ounce
Lampblack	¼	av. ounce

Melt the wax, add the turpentine, a portion first to the finely powdered Prussian blue and lampblack, and thin with neatsfoot oil.

Harness Pastes.—

I.—Ceresine, natural yellow	1.5 parts
Yellow beeswax	1.5 parts
Japan wax	1.5 parts

Melt on the water bath, and when half cooled stir in 8 parts of turpentine oil.

Harness Grease.—

	By weight
II.—Ceresine, natural yellow	2.5 parts
Beeswax, yellow	0.8 parts
French colophony, pale	0.4 parts

	By weight
III.—French oil turpentine	2.0 parts
Intimately mixed in the cold with American lampblack	1.5 parts

Put mixture I in a kettle and melt over a fire. Remove from the fire and stir in mixture II in small portions. Then pour through a fine sieve into a second vessel, and continue pouring from one kettle into the other until the mass is rather thickish. Next fill in cans.

Should the mixture have become too cold during the filling of the cans, the vessel containing the grease need only be placed in hot water, whereby the contents are rendered liquid again, so that pouring out is practicable. For perfuming, use cinnamon oil as required.

This harness grease is applied by means of a rag and brushed.

Waterproof Harness Composition.—See also Waterproofing.

	By weight
Rosin spirit	27¼ parts
Dark mineral oil	13½ parts
Paraffine scales	16.380 parts
Lampblack	7.940 parts
Dark rosin	5.450 parts
Dark syrup	5.450 parts
Naphthalene black	2.500 parts
Berlin blue	0.680 parts
Mirbane oil	0.170 parts

Melt the paraffine and the rosin, add the mineral oil and the rosin spirit, stir the syrup and the pigments into this, and lastly add the mirbane oil.

PATENT AND ENAMELED LEATHER.

Patent leather for boots and shoes is prepared from sealskins, enameled leather for harness from heavy bullock's hides. The process of tanning is what is called "union tannage" (a mixture of oak and hemlock barks). These tanned skins are subjected to the process of soaking, unhairing, liming, etc., and are then subjected to the tanning process. When about one-third tanned a buffing is taken off (if the hides are heavy), and the hide is split into three layers. The top or grain side is reserved for enameling in fancy colors for use on tops of carriages; the middle layer is finished for splatter

boards and carriage trimmings, and some parts of harness; the underneath layer, or flesh side is used for shoe uppers and other purposes. The tanning of the splits is completed by subjecting them to a gambier liquor instead of a bark liquor.

When the splits are fully tanned they are laid on a table and scored, and then stretched in frames and dried, after which each one is covered on one side with the following compound, so as to close the pores of the leather that it may present a suitable surface for receiving the varnish: Into 14 parts of raw linseed oil put 1 part dry white lead and 1 part silver litharge, and boil, stirring constantly until the compound is thick enough to dry in 15 or 20 minutes (when spread on a sheet of iron or china) into a tough, elastic mass, like caoutchouc. This compound is laid on one side of the leather while it is still stretched in the frame. If for enameled leather (i. e., not the best patent), chalk or yellow ocher may be mixed in the above compound while boiling, or afterwards, but before spreading it on the leather.

The frames are then put into a rack in a drying closet, and the coated leather dried by steam heat at 80° to 160° F., the heat being raised gradually. After removal from the drying closet, the grounding coat previously laid on is pumiced, to smooth out the surface, and then given 2 or 3 coats of the enameling varnish, which consists of Prussian blue and lampblack boiled with linseed oil and diluted with turpentine, so as to enable it to flow evenly over the surface of the coated leather. When spread on with a brush, each coating of the enamel is dried before applying the next, and pumiced or rubbed with tripoli powder on a piece of flannel (the coat last laid on is not subjected to this rubbing), when the leather is ready for market.

To prepare the enameling composition, boil 1 part asphaltum with 20 parts raw linseed oil until thoroughly combined; then add 10 parts thick copal varnish, and when this mixture is homogeneous dilute with 20 parts spirit of turpentine.

Instead of the foregoing enameling varnish the following is used for superior articles:

Prussian blue.....	18 ounces
Vegetable black...	4 ounces
Raw linseed oil....	160 fluidounces

Boil together as previously directed, and dilute with turpentine as occasion requires. These enameling varnishes should be made and kept several weeks in the same room as the varnishing is carried on, so that they are always subjected to the same temperature.

STAINS FOR PATENT LEATHER:

Black Stain.—

Vinegar.....	1 gallon
Ivory black.....	14 ounces
Ground iron scales...	6 pounds

Mix well and allow to stand a few days.

Red Stain.—Water, 1 quart; spirit of hartshorn, 1 quart; cochineal, ¼ pound. Heat the water to near the boiling point, and then dissolve in it the cochineal, afterwards adding the spirit of hartshorn. Stir well to incorporate.

Liquid Cochineal Stain.—

Good French carmine	2½ drachms
Solution of potash.....	½ ounce
Rectified spirit of wine	2 ounces
Pure glycerine.....	4 ounces
Distilled water to make	1 pint.

To the carmine in a 20-ounce bottle add 14 ounces of distilled water. Then gradually introduce solution of potash, shaking now and again until dissolved. Add glycerine and spirit of wine, making up to 20 ounces with distilled water, and filter.

Blue Black.—Ale droppings, 2 gallons; bruised galls, ½ pound; logwood extract, ¼ pound; indigo extract, 2 ounces; sulphate of iron, 3½ ounces. Heat together and strain.

Finishers' Ink.—Soft water, 1 gallon; logwood extract, 1¼ ounces; green vitriol, 2½ ounces; potassium bichromate, ½ ounce; gum arabic, ½ ounce.

Grind the gum and potassium bichromate to powder and then add all the coloring ingredients to the water and boil.

To Restore Patent Leather Dash.—Take raw linseed oil, 1 part; cider vinegar, 4 ounces; alcohol, 2 ounces; butter of antimony, 1 ounce; aqua ammonia, ½ ounce; spirits of camphor, ½ ounce; lavender, ½ ounce. Shake well together; apply with a soft brush.

PRESERVATIVES FOR LEATHER.

I.—Mutton suet.....	50 parts
Sweet oil.....	50 parts
Turpentine.....	1 part

Melt together.

The application should be made on the dry leather warmed to the point where it will liquefy and absorb the fat.

II.—Equal parts of mutton fat and linseed oil, mixed with one-tenth their

weight of Venice turpentine, and melted together in an earthen pipkin, will produce a "dubbin" which is very efficacious in preserving leather when exposed to wet or snow, etc. The mixture should be applied when the leather is quite dry and warm.

III.—A solution of 1 ounce of solid paraffine in 1 pint light naphtha, to which 6 drops of sweet oil have been added, is put cold on the soles, until they will absorb no more. One dressing will do for the uppers. This process is claimed to vastly increase the tensile strength.

Patent Leather Preserver.—

Carnauba wax.....	1.0 part
Turpentine oil.....	9.5 parts
Aniline black, soluble in fat.....	0.06 parts

Melt the wax, stir in the turpentine oil and the dye and scent with a little mirbane oil or lavender oil. The paste is rubbed out on the patent leather by means of a soft rag, and when dry should be polished with a soft brush.

REVIVERS AND REGENERATORS.

	By weight.
I.—Methylic alcohol....	22½ parts
Ground ruby shellac	2.250 parts
Dark rosin.....	0.910 parts
Gum rosin.....	0.115 parts
Sandarac.....	0.115 parts
Lampblack	0.115 parts
Aniline black, spirit-soluble.....	0.115 parts

The gums are dissolved in spirit and next the aniline black soluble in spirit is added; the lampblack is ground with a little liquid to a paste, which is added to the whole, and filtering follows.

Kid Reviver.—

	By weight.
II.—Clear chloride of lime solution.....	3.5 parts
Spirit of sal ammoniac.....	0.5 parts
Scraped Marseilles soap.....	4.5 parts
Water.....	6.0 parts

Mix chloride of lime solution and spirit of sal ammoniac and stir in the soap dissolved in water. Revive the gloves with the pulpy mass obtained, by means of a flannel rag.

TANNING LEATHER.

Pickling Process.—Eitner and Stiazny have made a systematic series of experiments with mixtures of salt and various acids for pickling skins preparatory to tanning. Experiments with hydrochloric acid, acetic and lactic acids showed that these offered no advantages over sulphuric acid for use in pickling, the pickled pelts and the leather produced from them being similar in appearance and quality. By varying the concentration of the pickle liquors, it was found that the amount of salt absorbed by the pelt from the pickle liquor was controlled by the concentration of the solution, 23 to 25 per cent of the total amount used being taken up by the pelt, and that the absorption capacity of the pelt for acid was limited.

The goods pickled with the largest amount of acid possessed a more leathery feel and after drying were fuller and stretched much better than those in which smaller amounts of acids were employed. Dried, pickled pieces, containing as much as 3 per cent of sulphuric acid, showed no deterioration or tendering of fiber. The pickled skins after chrome tanning still retained these characteristics. An analysis of the leather produced by tanning with sumac showed that no free acid was retained in the finished leather. An Australian pickled pelt was found to contain 19.2 per cent of salt and 2.8 per cent of sulphuric acid.

From a very large number of experiments the following conclusions were drawn: 1. That sulphuric acid is quite equal in efficiency to other acids for the purpose. 2. To a certain limit increasing softness is produced by increasing the quantity of acid used. 3. For naturally soft skins and when a leather not very soft is required the best results are obtained by using 22 pounds of salt, 2.2 pounds of sulphuric acid, and 25 gallons of water for 110 pounds of pelt in the drum. 4. For material which is naturally hard and when a soft leather is required, the amount of acid should be increased to 4.4 pounds, using similar amounts as those given above of pelt, salt, and water.

French Hide Tanning Process.—I.—The prepared pelts are submitted to a 3 to 4 hours' immersion in a solution of rosin soap, containing 5 to 10 per cent of caustic soda. The goods are afterwards placed in a 6 to 12 per cent solution of a salt of chromium, iron, copper, or aluminum (preferably aluminum sulphate) for 3 to 4 hours.

II.—The hides are soaked in a solution of sodium carbonate of 10° Bé. for 3 to 6 hours. After washing with water they are allowed to remain for 5 hours in

a bath of caustic soda, the strength of which may vary from 2° to 30° Bé. From this they are transferred to a bath of hydrochloric acid (1° to 5° Bé.) in which they remain for 2 hours. Finally the hides are washed and the beam-work finished in the usual way. The tannage consists of a special bath of sodium or ammonium sulphoricinoleate (2 to 30 per cent) and sumac extract, or similar tanning material (2 to 50 per cent). The strength of this bath is gradually raised from 4° to 30° or 40° Bé.

Tanning Hides for Robes.—The hides should be very thoroughly soaked in order to soften them completely. For dry hides this will require a longer time than for salted. A heavy hide requires longer soaking than a skin. Thus it is impossible to fix a certain length of time. After soaking, the hide is fleshed clean, and is now ready to go into the tan liquor, which is made up as follows: One part alum; 1 part salt; ¼ to ½ part japonica. These are dissolved in hot water in sufficient quantity to make a 35° liquor. The hide, according to the thickness, is left in the tan from 5 to 10 days. Skins are finished in about 2 or 3 days. The hide should be run in a drum for about 2 hours before going into tan, and again after that process. In tanning hides for robes, shaving them down is a main requisite for success, as it is impossible to get soft leather otherwise. After shaving put back into the tan liquor again for a day or two and hang up to dry. When good and hard, shave again and lay away in moist sawdust and give a heavy coat of oil. When dry, apply a solution of soft soap; roll up and lay away in moist sawdust again. Run the hides on a drum or wheel until thoroughly soft. The composition of the tan liquor may be changed considerably. If the brownish tinge of the japonica be objectionable, that article may be left out entirely. The japonica has the effect of making the robe more able to resist water, as the alum and salt alone are readily soaked out by rain.

Lace Leather.—Take cow hides averaging from 25 to 30 pounds each; 35 hides will make a convenient soak for a vat containing 1,000 gallons of water, or 25 hides to a soak of 700 gallons. Soak 2 days or more, as required. Change water every 24 hours. Split and flesh; resoak if necessary. When thoroughly soft put in limes. Handle and strengthen once a day, for 5 or 6 days. Unhair and wash. Bathe in hen manure, 90° F. Work out of drench, wash well, drain 4 of 5 hours. Then process, using 45 pounds vitriol and 600 pounds of soft water to 700 gallons of water. In renewing process for second or consecutive packs, use 15 pounds vitriol and 200 pounds salt, always keeping stock constantly in motion during time of processing. After processing, drain over night, then put in tan in agitated liquors, keeping the stock in motion during the whole time of tanning. Pack down overnight. Use 200 pounds dry leather to each mill in stuffing.

For stuffing, use 3 gallons curriers' hard grease and 3 gallons American cod oil. Strike out from mill, on flesh. Set out on grain. Dry slowly. Trim and board, length and cross. The stock is then ready to cut. The time for soaking the hides may be reduced one-half by putting the stock into a rapidly revolving reel pit, with a good inflow of water, so that the dirty water washes over and runs off. After 10 hours in the soak, put the stock into a drum, and keep it tumbling 5 hours. This produces soft stock.

In liming, where the saving of the hair is no object, softer leather is obtainable by using 35 pounds sulphide of sodium with 60 pounds lime. Then, when the stock comes from the limes, the hair is dissolved and immediately washes off, and saves the labor of unhairing and caring for the hair, which in some cases does not pay.

MISCELLANEOUS RECIPES:

Russian Leather.—This leather owes its name to the country of its origin. The skins used for its production are goat, large sheep, calfskin, and cow or steer hide. The preliminary operations of soaking, unhairing, and fleshing are done in the usual manner, and then the hides are permitted to swell in a mixture of rye flour, oat flour, yeast, and salt. This compound is made into a paste with water, and is then thinned with sufficient water to steep a hundred hides in the mixture. The proportions of ingredients used for this mixture are 22 pounds rye flour, 10 pounds oat flour, a little salt, and sufficient yeast to set up fermentation.

The hides are steeped in this compound for 2 days, until swelled up, and then put into a solution of willow and poplar barks, in which they are allowed to remain 8 days, being frequently turned about. The tanning process is then completed by putting them into a tanning liquor composed of pine and willow barks, equal parts. They are steeped 8 days in this liquor, and then a

fresh liquor of the same ingredients and proportions is made up. The hides are hardened and split, and then steeped in the freshly made liquor for another 8 days, when they are sufficiently tanned.

The hides are then cut down the middle (from head to tail) into sides, and scoured, rinsed, and dried by dripping, and then passed on to the currier, who slightly dampens the dry sides and puts them in a heap or folds them together for a couple of days to temper, and then impregnates them with a compound consisting of ⅔ parts birch oil and ⅓ parts seal oil. This is applied on the flesh side for light leather, and on the grain side also for heavy leather. The leather is then "set out," "whitened," and well boarded and dried before dyeing.

A decoction of sandalwood, alone or mixed with cochineal, is used for producing the Russian red color, and this dye liquor is applied several times, allowing each application to dry before applying the following one. A brush is used, and the dye liquor is spread on the grain side. A solution of tin chloride is used in Russia as a mordant for the leather before laying on the dye. The dye liquor is prepared by boiling 18 ounces of sandalwood in 13 pints of water for 1 hour, and then filtering the liquid and dissolving in the filtering fluid 1 ounce of prepared tartar and soda, which is then given an hour's boiling and set aside for a few days before use.

After dyeing, the leather is again impregnated with the mixture of birch and seal oils (applied to the grain side on a piece of flannel) and when the dyed leather has dried, a thin smear of gum-dragon mucilage is given to the dyed side to protect the color from fading, while the flesh side is smeared with bark-tan juice and the dyed leather then grained for market.

Toughening Leather. — Leather is toughened and also rendered impervious by impregnating with a solution of 1 part of caoutchouc or gutta-percha in 16 parts of benzene or other solvent, to which is added 10 parts of linseed oil. Wax and rosin may be added to thicken the solution.

Painting on Leather.— When the leather is finished in the tanneries it is at the same time provided with the necessary greasy particles to give it the required pliancy and prevent it from cracking. It is claimed that some tanners strive to obtain a greater weight thereby, thus increasing their profit, since a pound of fat is only one-eighth as dear as a pound of leather.

If such leather, so called kips, which are much used for carriage covers and knee caps, is to be prepared for painting purposes, it is above all necessary to close up the pores of the leather, so that the said fat particles cannot strike through. They would combine with the applied paint and prevent the latter from drying, as the grease consists mainly of fish oil. For this reason an elastic spirit leather varnish is employed, which protects the succeeding paint coat sufficiently from the fat.

For further treatment take a good coach varnish to which ¼ of stand oil (linseed oil which has thickened by standing) has been added and allow the mixture to stand for a few days. With this varnish grind the desired colors, thinning them only with turpentine oil. Put on 2 coats. In this manner the most delicate colors may be applied to the leather, only it is needful to put on pale and delicate shades several times. In some countries the legs or tops of boots are painted yellow, red, green, or blue in this manner. Inferior leather, such as sheepskin and goat leather, which is treated with alum by the tanner, may likewise be provided with color in the manner stated. Subsequently it can be painted, gilded, or bronzed.

Stains for Oak Leather.—I.—Apply an intimate mixture of 4 ounces of umber (burnt or raw); ½ ounce of lampblack, and 17 fluidounces ox gall.

II.—The moistened leather is primed with a solution of 1 part, by weight, of copper acetate in 50 parts of water, slicked out and then painted with solution of yellow prussiate potash in feebly acid water.

LEATHER PLASTIC (Shoe Resoler):

(A Putty-like Substance to Resole Shoes).—

40 ounces	India Rubber (small sheets)
7 ounces	Powdered Rosin
9 ounces	Liquid Shellac
18 ounces	Powdered Leather
6 pounds	Carbon Bisulphide

Cut rubber in small pieces and dissolve in carbon bisulphide. When dissolved add the rosin, then shellac. Mix well. If too thick thin with wood alcohol. Then mix in the powdered leather until you have a fairly thick paste.